

What is claimed is:

1. A laser-transmissible resin composition for laser welding comprising:

5 100 parts by weight of a thermoplastic resin,

0.01 to 3 parts by weight of titanium oxide that has density of at least 4 g/cm<sup>3</sup> and an average particle size of 100 to 400 nm;

and exhibiting whitish hue of white, gray or tint color.

10 2. The laser-transmissible resin composition according to claim 1, wherein a refractive index:  $n_1$  of said titanium oxide and a refractive index:  $n_2$  of the thermoplastic resin satisfy following numerical expressions (1) and (2).

$$n_1 - n_2 \geq 1.0 \quad \cdots(1)$$

15  $1.4 < n_2 < 1.7 \quad \cdots(2)$

3. The laser-transmissible resin composition according to claim 1, wherein the thermoplastic resin is polypropylene resin and/or polycarbonate resin.

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4. The laser-transmissible resin composition according to claim 1, comprising 0.01 to 1 parts by weight of a laser-transmissible colorant to 100 parts by weight of the thermoplastic resin.

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5. The laser-transmissible resin composition according to

claim 1, comprising at least one inorganic filler selected from the group consisting of talc, mica, calcium hydrogencarbonate, calcium carbonate, glass fiber, glass flake, glass beads, wollastonite and barium sulfate.

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6. The laser-transmissible resin composition according to claim 1, comprising an organic flame retarder.

7. A laser-transmissible resin workpiece for laser welding  
10 molded out of a laser-transmissible resin composition for the laser welding exhibiting whitish hue of white, gray or tint color and comprising 100 parts by weight of a thermoplastic resin and 0.01 to 3 parts by weight of titanium oxide that has density of at least 4 g/cm<sup>3</sup> and an average particle size of 100 to 400 nm,

15 and exhibiting opaque whitish hue of white, gray or tint color.

8. The laser-transmissible resin workpiece according to claim 7, wherein a refractive index:  $n_1$  of said titanium oxide and a  
20 refractive index:  $n_2$  of the thermoplastic resin satisfy following numerical expressions (1) and (2).

$$n_1 - n_2 \geq 1.0 \quad \cdots(1)$$

$$1.4 < n_2 < 1.7 \quad \cdots(2)$$

25 9. The laser-transmissible resin workpiece according to claim 7, wherein the thermoplastic resin is polypropylene resin and/or

polycarbonate resin.

10. The laser-transmissible resin workpiece according to claim 7, wherein in the laser-transmissible resin composition comprises 0.01 to 1 parts by weight of a laser-transmissible colorant to 100 parts by weight of the thermoplastic resin.

11. The laser-transmissible resin workpiece according to claim 7, wherein in the laser-transmissible resin composition comprises at least one inorganic filler selected from the group consisting of talc, mica, calcium hydrogencarbonate, calcium carbonate, glass fiber, glass flake, glass beads, wollastonite and barium sulfate.

12. The laser-transmissible resin workpiece according to claim 7, wherein in the laser-transmissible resin composition comprises an organic flame retarder.

13. The laser-transmissible resin workpiece according to claim 7, wherein whiteness degree:  $W_1$  of the hue, that determined from the following numerical expression (I) using L-value, a-value and b-value of  $L^*a^*b^*$  color specification, is at least 80.

$$W_1 = 100 - \sqrt{(100 - L)^2 + (a^2 + b^2)} \quad \cdots (I)$$

14. The laser-transmissible resin workpiece according to claim

7, wherein laser-transmissivity is at least 15 %.

15. A method for laser welding comprising:

5 piling a resin workpiece being at least partly capable of the  
laser-absorption onto a laser-transmissible resin workpiece for the  
laser welding exhibiting opaque whitish hue of white, gray or tint  
color, that molded out of a laser-transmissible resin composition  
for the laser welding comprising 100 parts by weight of a  
thermoplastic resin and 0.01 to 3 parts by weight of titanium oxide  
10 that has density of at least 4 g/cm<sup>3</sup> and an average particle size  
of 100 to 400 nm and exhibiting whitish hue of white, gray or tint  
color,

irradiating a laser beam thereto to weld them thermally.

15 16. The method for the laser welding according to claim 15,  
wherein a refractive index:  $n_1$  of said titanium oxide and a  
refractive index:  $n_2$  of the thermoplastic resin satisfy following  
numerical expressions (1) and (2).

$$n_1 - n_2 \geq 1.0 \quad \cdots(1)$$

20  $1.4 < n_2 < 1.7 \quad \cdots(2)$

17. The method for the laser welding according to claim 15,  
wherein the thermoplastic resin is polypropylene resin and/or  
polycarbonate resin.

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18. The method for the laser welding according to claim 15,

wherein the laser-transmissible resin composition comprises 0.01 to 1 parts by weight of a laser-transmissible colorant to 100 parts by weight of the thermoplastic resin.

5 19. The method for the laser welding according to claim 15, wherein the laser-transmissible resin composition comprises at least one inorganic filler selected from the group consisting of talc, mica, calcium hydrogencarbonate, calcium carbonate, glass fiber, glass flake, glass beads, wollastonite and barium  
10 sulfate.

20. The method for the laser welding according to claim 15, wherein the laser-transmissible resin composition comprises an organic flame retarder.

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21. The method for the laser welding according to claim 15, wherein whiteness degree:  $W_1$  of the hue, that determined from the following numerical expression (I) using L-value, a-value and b-value of  $L^*a^*b^*$  color specification, is at least 80.

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$$W_1 = 100 - \sqrt{(100 - L)^2 + (a^2 + b^2)} \quad \dots (I)$$

22. The method for the laser welding according to claim 15, wherein laser-transmissivity of the laser-transmissible resin workpiece is at least 15 %.

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23. The method for the laser welding according to claim 15,  
 wherein the resin workpiece being at least partly capable of the  
 laser-absorption is made from a whitish resin material including a  
 laser-absorbent being capable of the laser-absorption under  
 5 region of 800 to 1200 nm of wavelength at least partially.

24. The method for the laser welding according to claim 23,  
 wherein the resin workpiece being at least partly capable of the  
 laser-absorption is a whitish resin material applied a  
 10 laser-absorptive layer including a laser-absorbent being capable  
 of the laser-absorption under region of 800 to 1200 nm of the  
 wavelength at least partially.

25. The method for the laser welding according to claim 23,  
 15 wherein the laser-absorbent is carbon black and/or nigrosine.

26. The method for the laser welding according to claim 23,  
 wherein whiteness degree:  $W_2$  of the hue of the whitish resin  
 material, that determined from the following numerical expression  
 20 (II) using L-value, a-value and b-value of  $L^*a^*b^*$  color  
 specification, is at least 80.

$$W_2 = 100 - \sqrt{(100 - L)^2 + (a^2 + b^2)} \quad \cdots \text{ (II)}$$

27. The method for the laser welding according to claim 24,  
 25 wherein the laser-absorptive layer is a resin film including the

laser-absorbent.

28. The method for the laser welding according to claim 24,  
wherein the laser-absorptive layer is applied by ink and/or paint  
5 including the laser-absorbent.